ROLLANS *SOIL & ENVIRONMENTAL SERVICES*

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Attached is a proposed design for a PPBPS Septic System with low pressure distribution for a 4 bedroom single family residence on Lot #6 in Lakewood Crossing Subdivision, Iredell County, North Carolina.

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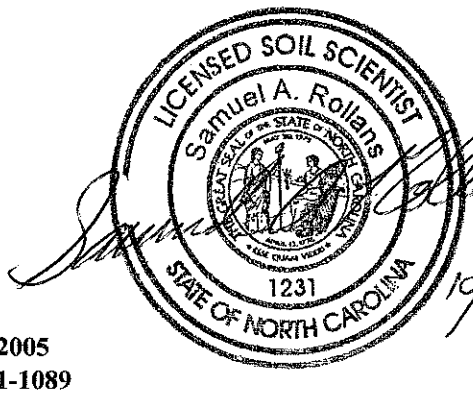
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10/21/05

October 7, 2005
Project No. 01-1089
Design By: Rollans Soil & Environmental Services

LP PPBPS SYSTEM
FOR WASTEWATER TREATMENT

Owner/Applicant:	Nation Land Company LLC
Address:	4330 Sterilite Street SE Massillion, OH 44646
Phone:	330-832-4091
County:	Iredell
Location:	Lakewood Crossing Subdivision Lot #6
Source of Wastewater Flow:	4 Bedroom Single Family Residence
Estimated Daily Wastewater Production:	480 gpd
System Flow:	27.62769231

Design Specifications

Drainfield Size:	292
Loading Rate:	0.3 gpd/ft.^{2}
Depth of Gravel in Trench:	NA (PPBPS)
Gravel Size:	NA (PPBPS)
Trench Depth:	36 in.
Trench Width:	36 in.
Septic Tank Size:	1000
Pump Tank Size:	1000
Estimated Supply Line Length:	94
Supply Line Diameter:	2 in. SCH 40 PVC
Supply Line Volume:	16.36
Dosing Volume:	162.53
Supply Manifold:	N/A
Supply Manifold Length:	N/A
Supply Manifold Volume:	N/A
Recommended Float Controls:	SJE Sensor Float Control Switches as Required for Control Panel or County Approved Equivalents
Recommended Control Panel:	SJE-Rhombus Model 112 (NEMA 4x) Control Panel or County Approved Control Panel.
Pressure Head:	2 ft.
Friction Head:	1.67
Elevation Head:	16.00
Total Dynamic Head:	22.62
Threaded Union:	In Tank
Gate Valves:	1 in Tank 1 per lateral (4)
Check Valves:	In Tank
Anti-Siphon Hole:	NA
Additional Comments:	Soil suitability was performed by Rollans Soil & Environmental Services

Lakewood Crossing Lot 6
LP PPBPS

DESIGN FLOW:	480
SOIL APPLICATION RATE:	0.3 gpd/ft.^{2}
TOTAL AREA TRENCH BOTTOM:	876
TOTAL LATERAL LENGTH:	292
NUMBER OF FIELDS:	1
LATERAL LENGTH REQUIRED PER FIELD:	266.6666667
SUPPLY LINE LENGTH:	94
TOTAL DYNAMIC HEAD:	22.62
MANIFOLD SIZE:	N/A
DOSING VOLUME:	162.53
PUMP TANK DRAW DOWN*:	7.7
SEPTIC TANK SIZE:	1000
PUMP TANK SIZE:	1000

**Pump tank draw down based on a volume basis of 21 gallons per inch. Draw down may vary among pump tank manufacturers.*

LP PPBPS TAPSHEET - Lakewood Crossing Lot 5

SYSTEM

Line #	Color	Elevation	Length	Hole Size	Flow/hole	Trench Area	Number of Panels
1	BLUE	104.6	**43**	0.156	**0.41**	129	9.923076923
2	PINK	103.7	**62**	0.156	**0.41**	186	14.30769231
3	ORANGE	101.7	**90**	0.156	**0.41**	270	20.76923077
4	BLUE	100.4	**97**	0.156	**0.41**	291	22.38461538
	total	**feet =**	**292**	**gal/min =**	**27.627692**		
			Des. Flow	**480**			
			Pump Run=	**5.88**			
			soil LTAR	**0.3**			
			LTAR +5%	**0.315**			
			LTAR with mod.	**0.27**			
			LTAR with mod.. + 5%	**0.2835**			

.156 equals 5/32 inch hole

Lakewood Crossing Lot 6

Project #: 01-1089

LAYOUT FOR 4 BEDROOM HOME — October 7, 2005

LINE #	FLAG COLOR	BS	HI	FS	ELEVATION	FLAGGED LINE LENGTH	DESIGN LINE LENGTH
TBM		6.1			100.00		
INSTR. 1			106.10				
HOUSE CNR				10.00	96.10		
P. TANK				10.50	95.60		
1	***BLUE***			***1.50***	***104.60***	***43***	***43***
2	***PINK***			***2.40***	***103.70***	***62***	***62***
3	***ORANGE***			***4.40***	***101.70***	***90***	***90***
4	***BLUE***			***5.70***	***100.40***	***97***	***97***
5	PINK			7.10	99.00	136	136
6	ORANGE			9.70	96.40	73	73
7	BLUE			11.20	94.90	45	45
8	PINK			12.30	93.80	40	40
					Total	586	586

	LINE LENGTH	LTAR GPD/FT2	SYSTEM TYPE	SOIL LTAR GPD/FT2	TRENCH SYSTEM	DISTRIBUTION
**** System***	***292***	***0.3***	***MOD.***	***0.30***	***PPBPS***	***LOW PRESSURE***
Repair	294	0.3	MOD.	0.30	PPBPS	LOW PRESSURE

Notes:
** TBM located top of ground at EIP at corner of lot 6 and 7 (see site plan)
**TBM is assumed to be 100'
**All measures in feet
**Nitrification lines are demonstrated on contour via colored pin flags
**BS, HI, and FS indicate rod readings

CALCULATIONS

Location	Lakewood Crossing	
Project Number	01-1089	
Lot No:	Lot 6	
No. of Bedrooms	4	
Design Flow	480	$^{gal}/_{day}$
LTAR	0.3	$^{gal}/_{ft^2\ day}$
PPBPS? (YES OR NO)	YES	
Supply Line Length	94	ft.
Supply Line Volume	16.356	gal.
Required Feet of Line	266.6667	ft.
Amount of Line from Layout	292	ft.
Gallons per Minute	27.62769	$^{gal}/_{min}$
	Note:	*Flow/hole (.41gpm) x # of panels (68)*
Required Septic Tank Capacity	1000	gal.
Minimum Standard Tank Size	1000	
Panel Volume	3.6	gal.
# of Panels	67.38462	
Dosing Volume	162.53	gal. 67
	Note:	*Dosing Volume based on 99% of # of panels times 3.6 gal/panel*
Tank Draw Down	7.7	*Generic Draw Down of 21 gal.per in.*
Pump Run Time	5.88	minutes
Elevation Head	16	ft.
Pressure Head	2	ft.
Friction Factor	1.78	ft./100 ft. *(From the interpolater.)*
Friction Head	1.67	ft.
Total Dynamic Head (+15%)	22.62	ft.

FRICTION FACTOR INTERPOLATER
2" SCH 40 PVC

GPM	*f*
20	0.84
	-0.88
25	1.27
	-1.28
30	1.78
	-1.76
35	2.37
	-2.25
40	3.03
43.07	3.48
45	3.77
48.14	4.28
50	4.58
57.11	5.89
60	6.42